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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,639	08/02/2006	Josephus Arnoldus Kahlman	NL040857	4293

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EXAMINER

LUM, LEON YUN BON

ART UNIT	PAPER NUMBER
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1641

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/597,639	Applicant(s) KAHLMAN ET AL.	
	Examiner Leon Y. Lum	Art Unit 1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 4,5 and 11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-10 and 12-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/2/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicants' election of claims 1-3, 6-8, 10 and 12-22 in the reply filed on June 23, 2009 is acknowledged. Because Applicants did not provide reasons traversing the restriction requirement, the election is considered to be made without traverse.

However, upon further consideration, claim 9 is rejoined with the elected group. Accordingly, claims 1-3, 6-10 and 12-22 are examined on the merits.

Information Disclosure Statement

The IDS filed August 8, 2006 has been entered and the two non-patent literature references considered. The URL in each listing, however, has been crossed-out because the links are inoperable.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8 and 12-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between

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the elements. See MPEP § 2172.01. The omitted elements are: first signal and second frequency. Indeed, the claim recites a "second signal with a third frequency." However, neither claim 8 nor base claim 1 recites a first signal or a second frequency. Given the focus on signal and frequency, it appears that the first signal and second frequency are essential elements of the claim; hence, their omission amounts to a gap between the claimed elements.

Claims 12-16 are rejected for the foregoing reasons due to their dependence on claim 8.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,743,639 to Tondra *et al.* ("Tondra") in view of U.S. Patent No. 5,065,093 to U.S. Patent 5,486,754 to Cruden *et al.* ("Cruden") and Nauta *et al.* ("Nauta").

i. Independent claim 1 is obvious

Tondra describes an apparatus comprising magnetoresistors on a substrate. See column 13, lines 45-60 and Figure 17 (depicting reference numbers "13" and "14" as the magnetoresistors). The magnetoresistors can be GMR sensors that sense a magnetic characteristic of a bead in the presence of an externally applied magnetic field. *Id.*; see also column 13, lines 23-25. With this description, Tondra teaches a magnetic sensor element on a substrate and at least one field generator as claimed.

Tondra, however, does not teach a cross-talk suppression means.

Cruden states that cross-talk occurs when magnetic fields from external sources interfere with the reading of a particular magnetic sensor. See column 4, lines 41-47.

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Nauta describes a means for screening magnetic fields between two measuring coils, in order to suppress mutual crosstalk. See abstract.

With the foregoing description in mind, one of ordinary skill in the art would have found it obvious to modify Tondra's apparatus by implementing crosstalk suppression means. Cruden indicates that cross-talk can occur due to an external magnetic field. Given this teaching, one of ordinary skill in the art would therefore recognize that Tondra's externally applied magnetic field would interfere with the GMR sensor. Accordingly, the skilled artisan would have been motivated to apply Nauta's screening means in order to suppress the crosstalk. Moreover, because Cruden and Nauta describe cross-talk in terms of a magnetic sensor, the skilled artisan would have had a reasonable expectation of success in combining these references with Tondra.

ii. Dependent claims 2-3 and 17 are obvious

Regarding claim 2, Tondra teaches a magnetic bead, as described above. See *supra* rejection of claim 1.

Regarding claim 3, Nauta teaches a screening means, as described above. *Id.*

Regarding claim 17, Tondra describes a guiding flux concentrator to concentrate externally applied magnetic fields. See column 9, lines 30-44.

Claims 1-3 and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 7,048,890 to Coehoorn *et al.* ("Coehoorn") in view of Cruden and Nauta.

i. Independent claim 1 is obvious

Coehoorn describes an apparatus comprising at least one magnetoresistive sensor on a substrate that can detect magnetic nanoparticles. See abstract; column 4, lines 4-20; Figures 1 and 5A. The magnetoresistive sensor detects the nanoparticles in the presence of an applied external magnetic field. See column 9, lines 39-42; column 5, lines 22-24; and Figure 6. With this description, Coehoorn teaches a magnetic sensor element on a substrate and at least one field generator as claimed.

Coehoorn, however, does not teach a cross-talk suppression means.

Cruden states that cross-talk occurs when magnetic fields from external sources interfere with the reading of a particular magnetic sensor. See column 4, lines 41-47.

Nauta describes a means for screening magnetic fields between two measuring coils, in order to suppress mutual crosstalk. See abstract.

With the foregoing description in mind, one of ordinary skill in the art would have found it obvious to modify Coehoorn's apparatus by implementing crosstalk suppression means. Cruden indicates that cross-talk can occur due to an external magnetic field. Given this teaching, one of ordinary skill in the art would therefore recognize that Coehoorn's externally applied magnetic field would interfere with the GMR sensor. Accordingly, the skilled artisan would have been motivated to apply Nauta's screening means in order to suppress the crosstalk. Moreover, because Cruden and Nauta describe cross-talk in terms of a magnetic sensor, the skilled artisan would have had a reasonable expectation of success in combining these references with Coehoorn.

ii. *Dependent claims 2-3 and 6-7 are obvious*

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Regarding claim 2, Coehoorn teaches a magnetic bead, as described above.

See supra rejection of claim 1.

Regarding claim 3, Nauta teaches a screening means, as described above. *Id.*

Regarding claims 6 and 7, Coehoorn teaches a current applied to coils which form the external magnetic generators. See column 9, lines 39-47. The magnetic field is perpendicular to the substrate. *Id.* Although Coehoorn does not explicitly recite an alternating current, one of ordinary skill in the art would have found it obvious to try an alternating current over a direct current. As held by the Supreme Court in *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 82 USPQ2d 1385 (U.S. 2007), an obvious to try rationale is proper, given a "finite number of identified, predictable solutions." *KSR* at 1397. Indeed, the Court stated that in such a case, "a person of ordinary skill has good reason to pursue the known options within his or her technical grasp." *Id.* Here, as would have been recognized by one of ordinary skill in the art, there are a limited number of ways in which a current is applied – either it is direct or alternating. Moreover, applying either one of these currents would give predictable results. Accordingly, with such a limited number of finite, predictable solutions, it would have been obvious for the skilled artisan to try alternating current.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tondra in view of Cruden and Nauta as applied to claim 1 above, and further in view of Coehoorn.

Tondra, Cruden and Nauta (together “Tondra”), described above, do not teach the magnetic field generator and magnetic sensor element positioned adjacent each other above a substrate.

Coehoorn, however, describes a magnetic source on top of the substrate. See Figure 6.

With the foregoing description in mind, one of ordinary skill in the art would have found it obvious to modify Tondra’s apparatus by placing the magnetic generator on top of the substrate. With this placement, Tondra’s apparatus would have the generator and magnetoresistive sensors in close proximity and both above the substrate. See Tondra, Figure 17 (depicting sensor “11” on top of substrate 30). The skilled artisan would have made the modification because both Tondra and Coehoorn are directed to using magnetoresistive sensors on substrates to detect magnetic particles. For the same reason, the skilled artisan would have had a reasonable expectation of success.

Claims 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tondra in view of Cruden and Nauta, or alternatively over Coehoorn in view of Cruden and Nauta, as applied to claim 1 above, and further in view of Smith *et al.*, Sensors (1999) (“Smith”), cited in the IDS filed August 2, 2006.

i. Claim 18 is obvious

Tondra, Coehoorn, Cruden and Nauta (“Tondra or Coehoorn”) do not teach an integrated circuit.

Smith describes an integrated GMR sensor that includes processing electronics that connect the GMR detector and field-generator straps (i.e., magnetic field generator). See page 4.

With the foregoing description in mind, one of ordinary skill in the art would have found it obvious to modify Tondra or Coehoorn's apparatus by integrating the magnetic generator and magnetoresistive sensor. The skilled artisan would have made the modification because doing so would provide a simpler apparatus to use. Moreover, because Tondra and Coehoorn each teach that a GMR sensor is applicable to their respective inventions, the skilled artisan would have had a reasonable expectation of success in combining Smith's teaching with that of Tondra or Coehoorn.

Claims 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tondra in view of Cruden and Nauta, or alternatively over Coehoorn in view of Cruden and Nauta, as applied to claim 1 above, and further in view of Smith as applied to claim 18 above, and further in view of U.S. Patent No. 5,930,200 to Kabel.

i. Claim 19 is obvious

Tondra, Coehoorn, Cruden, Nauta and Smith ("Tondra or Coehoorn") do not teach a storage element.

Kabel, however, describes a memory for storing cross-talk information. See column 2, lines 45-47.

With the foregoing description in mind, one of ordinary skill in the art would have found it obvious to modify Tondra or Coehoorn's apparatus to include a memory for

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storing cross-talk information. The skilled artisan would have made the modification because storing cross-talk information allows the sensor to automatically compensate for the interference.

ii. Claims 20-22 are obvious

Regarding claim 20, Tondra teaches a GMR sensor, as described above. *Id.*

Regarding claims 21 and 22, the magnetic bead is used as a label to bind to a molecular species, thereby allowing the apparatus to be used as a diagnostic tool for biological samples. See Tondra, column 2, lines 6-23.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3, 6-10 and 17-22 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-14 of U.S. Patent No. 7,508,200 alone or in view of the secondary references above.

i. Claim 1 is unpatentable

Claim 1 recites a magnetic sensor device comprising a magnetic sensor element on a substrate, at least one magnetic field generator for generating a magnetic field on the substrate, wherein cross-talk suppression means are present for suppressing cross-talk between the magnetic sensor element and the at least one magnetic field generator.

Claims 1-14 of the '200 Patent recite a magnetic sensor that generates an electrical object signal (U) after sensing a magnetic stray field (SF), and also comprises a magnetic field generator for generating a magnetic main field (H). The sensor further has a cross-talk reduction means for reducing the effect of a cross-talk signal component in U caused by magnetic cross-talk between H and SF. Accordingly, the claimed magnetic sensor comprising a magnetic field generator, a sensor element and a cross-talk reduction means. With this description, the claims teach the limitations of instant claim 1.

ii. Claims 2-3, 6-10 and 17-22 are unpatentable

For dependent claims 2-3, 6-10 and 17-22, these claims are taught either by the '200 Patent alone or in combination with the references above.

Specifically regarding instant claims 2-3, 6-7, 10 and 17, the Tondra and Coehoorn references recite the limitations specified in these claims. It would have been

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obvious to modify the '200 Patent to arrive at the claimed inventions because Tondra and Coehoorn are both directed to using magnetic sensing using a magnetic field generator and sensor, and applying it to biological testing allows the user to determine the presence and concentration of a biological molecule.

Specifically regarding instant claims 8 and 9, claim 7 of the '200 Patent recites two magnetic generators having a first and second frequencies.

Specifically regarding claim 18, the Smith reference teaches the integrated circuit. It would have been obvious to modify the '200 Patent by including an integrated circuit as taught by Smith. The skilled artisan would have made the modification because doing so would provide a simpler apparatus to use.

Specifically regarding claims 19-22, the Kabel reference teaches the storage element. It would have been obvious to modify the '200 Patent by including a storage element as taught by Kabel. The skilled artisan would have made the modification because storing cross-talk information allows the sensor to automatically compensate for the interference.

Allowable Subject Matter

Aside from the rejection under paragraph 112 and/or the obvious double patenting rejection above, claims 8 and 12-16 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Aside from the obvious double patenting rejection above, claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon Y. Lum whose telephone number is (571) 272-2872. The examiner can normally be reached on Monday to Friday (8:30 am to 5:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark L. Shibuya can be reached on (571) 272-0806. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon Y. Lum/
Examiner, Art Unit 1641

/Nelson Yang/
Primary Examiner, Art Unit 1641